REMARKS/ARGUMENTS

Reconsideration of the application in view of the above amendments and the following remarks is respectfully requested. The Examiner rejects Claims 1-10 under 35 U.S.C. 103(a) as being unpatentable over Harai (Harari) in view Horioka et al. The Examiner states that the Harai references teaches a method of making a semiconductor. Applicants believe that the Examiner is referring to the Harari reference, since no Harai reference is of record or newly cited. The Examiner states that the sole difference between the instant claims and the prior art is the further etching of the trench. The Examiner states that the Horioka et al reference teaches to further etch the bottom of a trench which as (has) a sidewall mask, and specifically refers to the translated abs. which the applicants have taken to mean abstract.

The Examiner recites Harari as disclosing a semiconductor process that includes the formation of a trench, wherein a trench penetrates the substrate and the Examiner states the advantages recited in Harari for this process. The Examiner did not specifically cite a portion of Harari in this action, but in a previous action did specifically refer to col. 13, line 30-68 of Harari. This portion of Harari refers to Figure 9. However, the key to the invention is really shown in Figure 7 and the text starting at col. 8,line 31 through the bottom of the page which describes Figure 7. It is clear from this process and this figure that the trench is formed utilizing only a single masking oxide and that after the trench is formed a second film is formed on the side of the trench. Thus, Harari clearly does not show the utilization of the first mask and the second mask film as an etching mask in etching the trenches deeper as recited in the present claims. In view of the fact that the present claims are method claims, all of the method steps must be considered. Furthermore, Harari fails to show or suggest the forming of a second mask film; the second film formed in Harari being an insulating film on the side of the trench, but it is not utilized as a mask.

Applicants have had the entire Horioka et al reference translated in order to fully understand the invention disclosed therein. A copy of this translation is enclosed herewith.

Figures 1 (a) – (d) of the Horioka reference a groove (trench) 14 forming processes is disclosed. In Figure 1 (a) a pattern of an oxide silicon film is formed as an etching mask 12 on the surface of a single-crystal silicon substrate 11. Figure 1 (b) shows a polycrystalline silicon film 13 is deposited on the whole surface (the silicon substrate 11 at an opening of the oxide silicon film 12 and the oxide silicon film 12). Figure 1 (c) shows the polycrystalline silicon film 13 is etched all over the surface until the oxide silicon film 12 is exposed by using a reactive ion etching in order to form the side wall made of the polycrystalline silicon as shown. Figure 1 (d) shows the polycrystalline silicon side wall 13 and the silicon substrate 11 being etched selectively by CDE (Chemical Dry Etching) using the oxide silicon film 12 as an etching mask in order to form the groove (trench) 14. In the enclosed translation, at page 5, lines 2-4, this reference recites "The etching of silicon using fluorine radicals is not very dependent upon direction or orientation with respect to the surface, and the polycrystalline silicon and the monocrystalline silicon are both etched at the same rate." (Emphasis added). This means that the polycrystalline silicon film 13 and the monocrystalline silicon substrate 11 are etched at the same rate, which means that the polycrystalline silicon sidewall 13 is not used as a mask because it is the object of the etching. According, this reference does not show or suggest using the first mask and the second mask film as an etching mask in etching the trenches deeper in the thickness of the insulating film so as to penetrate into a portion of the substrate, as recited in Claim 1.

Claims 1-3 have been amended in order to correct obvious formal errors, and not in view of the art cited in this Official Action.

Accordingly, applicants believe the application, as amended, is in condition for allowance, and such action is respectfully requested.

Respectfully submitted,
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